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EXAMINER	
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1767	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/788,339	TSUGE, SADAJI	
	Examiner	Art Unit	
	ALEXANDER KOLLIAS	1767	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 June 2012*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *16,18-20 and 28-32* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *16, 18-20, 28-32* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/20/2012 has been entered.

2. It is noted that claims 16, 18-20, 28-32 are pending; claims 1-15, 17, and 21-27 have been cancelled. Further, although claim 16 has been amended to recite a plurality of solar cell elements, the prior art references of record remain relevant against the present claims.

Claim Rejections - 35 USC § 112

3. The following is a quotation of 35 U.S.C. 112(a):

(a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), first paragraph:
The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 32 is rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one

skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.

5. Claim 32 recites that the rear surface film is a plastic film which does not include any metal foil. The cited phraseology, does not include any metal foil, clearly signifies a "negative" or "exclusionary" limitation for which the applicants have no support in the original disclosure. Negative limitations in a claim which do not appear in the specification as filed introduce new concepts and violate the description requirement of 35 USC 112, first paragraph, *Ex Parte Grasselli, Suresh, and Miller*, 231 USPQ 393, 394 (Bd. Pat. App. and Inter. 1983); 783 F. 2d 453.

The insertion of the above phraseology as described above positively excludes a metal foil, however, there is no support in the present specification for such exclusions. While the present specification is silent with respect to the use of a metal foil, is noted that as stated in MPEP 2173.05(i), the "mere absence of a positive recitation is not the basis for an exclusion."

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 16, 18-20, and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-307791 (referred to hereafter as JP '791 – see English language translation attached to previous Office Action) in view of Baskett et al (US 3,957,537), Hanoka et al (US 5,476,553), Brandhorst (US 4,131,486), and Spitzer (US 4,667,060).

Regarding claim 16, JP '791 discloses a solar cell module (Figures 1 and 2) comprising:

a. a plurality of solar cell elements (Figure 1, item 1);

b. a front surface glass member adhered at a light incidence side of the solar cell element by a resin (EVA 2 lying between the cells 1 and glass 3; Paragraph 0023)

c. a rear surface film member comprising a transparent resin film adhered at a rear surface side of the solar cell element by a resin (PET film 4 is adhered at a rear surface side of the solar cell element by a resin EVA 2 lying between cells 1 and PET film 4; Paragraph 0023)

d. the solar cell elements include a crystalline semiconductor substrate formed of an n-type crystalline semiconductor and a p-type amorphous silicon layer formed on one

surface of the crystalline semiconductor substrate, and comprises a semiconductor junction formed by the n-type crystalline semiconductor substrate and the p-type amorphous silicon laver (Figure 2, and [0024] discloses a n-type crystalline silicon substrate 11, there is laminated an i-type a-Si layer 12 and p-type amorphous Si layer 13)

JP '791 teaches all the claim limitations as set forth above. However, the reference does not explicitly teach that the front glass contains sodium, and that the solar cell element has the crystalline semiconductor substrate disposed on a side of the resin containing the sodium ion and the p-type amorphous silicon laver disposed on an opposite side of the resin so as to shield a diffusion of the sodium ion from the resin to the semiconductor junction.

Baskett et al discloses that glass is a preferred material utilized as a transparent member forming part of a solar module (Column 1 Lines 56-68). The reference discloses that glass in general is highly weather resistant, incombustible, and transparent to visible light (Column 1 Lines 55-68). Soda lime glass is particularly preferred given that it is noted transparent to ultraviolet light having a wavelength below about 300 nm and therefore protect the hold-melt adhesive which is utilized for adhering the glass to the module from degrading (Column 1 Lines 55-68). As evidenced by Hanoka et al EVA resin degrades under influence of ultraviolet light (Column 3 Lines 60-67).

Thus, given that JP '971 discloses the use of glass which is adhered to photovoltaic modules by an EVA resin which as evidenced by Hanoka et al EVA degrades under the influence of ultraviolet light, and given that Baskett et al discloses that soda lime silicate glass is utilized in photo-cells in order to prevent ultraviolet light from deteriorating the resin utilized in such devices, it would have been obvious to one having ordinary skill in the art at the time the

invention was made to have utilized the soda lime glass disclosed by Baskett et al in the solar module of JP '971 in order to prevent degradation of the EVA resin utilized to adhere the glass to the solar module with a reasonable expectation of success.

Further, it is noted that in such a combination, the presence of sodium ions in the resin lying between the cells and the glass member must be considered inherent, inasmuch as the instant disclosure teaches that sodium ions diffuse from a glass layer into the sealing resin under conventional conditions (Specification Page 5, line 19 - Page 7, line 2) Therefore, it is the Examiner's position given that solar module taught by the combination of prior art references would necessarily and intrinsically possess sodium ions depositing from the front surface glass as presently claimed.

Regarding the position of the n-type crystalline substrate 11 with respect to the thin film amorphous layers 12, 13 and the light incidence side light transmitting member, the solar cell module of JP '791 allows light to enter from both sides (Figures 1, 5, and 6), but the front surface side light transmitting member 3 is at the principal light incidence side (see paragraphs 0023 and 0026-0028). Therefore, light coming in from either direction contributes to the generation of electricity. Furthermore, with respect to the solar cell in JP '791's Figure 2, note in JP '791's paragraph 0024 that it is taught that on one principal plane of the crystalline silicon substrate 11, there is laminated an i-type a-Si layer 12 and p-type a-Si layer 13. It is also taught that on the principal plane on another side of the crystalline silicon substrate 11 there is laminated i-type a-Si layer 16 and n-type a-Si layer 17 (see paragraph 0024). JP '791 does not require said one principal plane on which the i-type a-Si layer 12 and p-type a-Si layer 13 to be the front face. JP '791 exemplifies the front face and recites "front face" in parenthesis for layers 12 and 13, and

exemplifies the rear face and recites "rear face" in parenthesis for layers 16 and 17 (see paragraph 0024; and Figure 2). However, JP '791 does not require layers 12 and 13 to be at the front surface and layers 16 and 17 to be at the rear face. Thus, a skilled artisan readily recognizes that the solar cell seen in Figure 2 of JP '791 can be placed in JP '791's module in Figure 1 with layers 12 and 13 at the front face (i.e., layers 12 and 13 closer to light transmitting member 3) or at the rear face (i.e., layers 12 and 13 closer to rear surface member 4). Such is the case because the solar cell in said Figure 2 can receive light from both sides (see Figure 1; and the first sentence of paragraph 0024). Furthermore, the presence of a photovoltaic junction at the rear face of a solar cell is well known in the art as shown by Brandhorst (Figures 2 and 4; and Column. 1, Line 60 through Column 2, Line 25) and Spitzer (see Figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have prepared JP '701's solar cell module such that the solar cell in JP '791's Figure 2 is present in the module with the p-i-n junction between layers 11, 12 and 13 at the rear face of the solar cell, and thus, the n-type crystalline silicon substrate 11 is between the resin adjacent principal light transmitting member 3 and the junction formed between p-type a-Si layer 13 and n-type substrate 11 because light can enter from both sides of JP '791's solar cell and thus, the p-i-n junction can be closer to either the light transmitting member 3 or the rear surface member 4; JP '791 is not limited to layers 12 and 13 to be at the front surface; and the presence of a photovoltaic junction at the rear face of a solar cell is well known in the art as shown by Brandhorst and Spitzer. In other words, to take the solar cell in JP '791's Figure 2, flip it over it over, and then insert it into JP '791's Figure 1, would have been within the level of ordinary skill in the art because light can enter from both sides of JP '791's solar cell in Figure 2, and thus, the

p-i-n junction can be closer to either the light transmitting member 3 or the rear surface member 4; JP '791 is not limited to layers 12 and 13 to be at the front surface; and the presence of a photovoltaic junction at the rear face of a solar cell is well known in the art as shown by Brandhorst and Spitzer.

Regarding claim 18, the combined disclosures of JP '791, Baskett et al, Hanoka et al, Brandhorst, and Spitzer teach all the claim limitations as set forth above. Additionally, JP '791 teaches that crystalline semiconductor substrate comprises a single crystalline silicon (n-type crystalline substrate 11 of Figure 2 is a single crystalline silicon - Paragraph 0024) as there is no teaching of a thickness required to shield diffusion of sodium ion in the instant specification, the thickness of this substrate is considered to inherently provide some shielding of the diffusion of sodium ion as claimed.

Regarding claim 19, the combined disclosures of JP '791, Baskett et al, Hanoka et al, Brandhorst, and Spitzer teach all the claim limitations as set forth above. Additionally it is noted that in the combination of prior art references described above, n-type a-Si layer 17 will be disposed between the n-type c-Si substrate 11 and the resin containing sodium ion.

Regarding claim 20, the combined disclosures of JP '791, Baskett et al, Hanoka et al, Brandhorst, and Spitzer teach all the claim limitations as set forth above. Additionally, it is noted that in the combination of prior art reference described above, transparent ITO electrode 18 will be disposed between the n-type a-Si layer 17 and the resin containing sodium ion.

Regarding claim 28, the combined disclosures of JP '791, Baskett et al, Hanoka et al, Brandhorst, and Spitzer teach all the claim limitations as set forth above. Additionally, JP '791 teaches a collective electrode disposed between the transparent electrode and the resin containing the sodium ion (Figure 2—in the flipped over configuration item 19 is the collective electrode which is between the transparent electrode item 14 and the EVA resin - item 2 of Figure 1)

Regarding claim 29, the combined disclosures of JP '791, Baskett et al, Hanoka et al, Brandhorst, and Spitzer teach all the claim limitations as set forth above. Additionally, JP '791 teaches a cell module according further comprising: a transparent electrode formed on the p-type amorphous silicon layer (item 14 in Figure 2 is formed on item 13 the amorphous silicon layer)..

Regarding claim 30, the combined disclosures of JP '791, Baskett et al, Hanoka et al, Brandhorst, and Spitzer teach all the claim limitations as set forth above. Additionally, JP '791 teaches a solar cell module a collective electrode disposed between the transparent electrode on the p-type amorphous silicon layer and the resin containing the sodium ion (figure 2 item 19 in the flipped over configuration discussed above is between the EVA resin containing sodium ions and the transparent electrode item 14).

9. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-307791 (referred to hereafter as JP '791 – see English language translation attached to previous Office Action), Baskett et al (US 3,957,537), Hanoka et al (US 5,476,553), Brandhorst (US 4,131,486),

and Spitzer (US 4,667,060) as applied to claims 16, 18-20, and 28-30 above, and in view of Andrulitis et al (US 4,241,493).

The discussion with respect to JP '791, Baskett et al, Hanoka et al, Brandhorst, and Spitzer as set forth in Paragraph 8 above is incorporated here by reference.

Regarding claim 31, the combined disclosures of JP '791, Baskett et al, Hanoka et al, Brandhorst, and Spitzer teach all the claim limitations as set forth above. However, JP '791 does not disclose that the plurality of solar cell elements are connected to each other in series or in parallel by connection leads.

Andrulitis et al discloses that In general, a solar cell module consists of an array of individual solar cells electrically interconnected and housed in a protective and supporting enclosure (Column 1 Lines 11-23). Further, typically, the individual solar cells of the module are arranged in columns and rows and are interconnected by flexible interconnector means which are positioned so as to connect the cells in the requisite series and/or parallel circuit arrangement (Column 1 Lines 11-23). The circuit arrangement, of course, depends upon the desired output voltage and current at the module peak power point (Column 1 Lines 11-23). Flexibility in the interconnectors permits slight movement of the individual cells in the array without breaking the electrical connections (Column 1 Lines 11-23).

In view of this teaching, it would have been obvious to one of ordinary skill in the art at the time of the invention to connect the solar elements disclosed in JP' 791 in series or parallel utilizing connectors, as doing so would amount to nothing more than use of known composition for its intended use, in a known environment to accomplish entirely expected results

Response to Arguments

10. Applicant's arguments filed 6/20/2012 have been fully considered but they are not persuasive.

11. In light of Applicants' amendment filed on 6/20/2012, the 35 U.S.C. first paragraph rejections set forth in Paragraph 6 of the Office Action mailed on 12/20/2011 is hereby withdrawn.

12. Applicants argue that it would not have been obvious for all of the solar cell elements in the solar module to be arranged to have the crystalline semiconductor substrate disposed on a side of the resin containing sodium ions and the p-type semiconductor amorphous silicon layer disposed on an opposite side of the resin so as to shield the diffusion of sodium ions from the resin to the semiconductor junction. That is, Applicants argue that it would not have obvious to one of ordinary skill in the art to disassemble the photovoltaic module disclosed by JP '971 and re-assemble in the present claimed configuration. However, as set forth on Page 4 the Board Decision, mailed on 2/11/2011, the Board affirmed the Examiner's rationale for the inversion of the configuration disclosed by JP '971 to the one present claimed. Specifically, the Board's decision states: *[T]he references applied in the rejections evidence that each of the structural elements and arrangements required by claim 16 were individually known in the prior art at the time of Appellant's invention. Further, the Answer contains detailed and convincing rationale in support of the Examiner's conclusion that it would have been obvious for one with ordinary*

skill in this art to combine and arrange these prior art elements in the manner claimed by Appellant." Therefore without evidence being proffered as to why it would not have been obvious to one of ordinary skill in the art of rearrange the configuration disclosed by JP '971, the Examiner's position remains that it would have been obvious to ordinary skill in the art to invert the configuration disclosed by JP '971 and arrive at the presently claimed configuration with a reasonable expectation of success.

13. Applicants argue that JP '791 is silent regarding the problem of sodium ions depositing in an adhering resin from a surface glass of a solar module. However, it is agreed that JP '791 does not disclose the use of sodium ions as recited in the present claims. It is for this reason that JP '791 was combined with Baskett et al which discloses that glass is a preferred material in photovoltaic modules. More specifically, the reference discloses that glass in general is highly weather resistant, incombustible, and transparent to visible light, Soda lime glass is particularly preferred given that it is noted transparent to ultraviolet light having a wavelength below about 300 nm and therefore protect the hold-melt adhesive which is utilized for adhering the glass to the module from degrading. Therefore, given that JP"971 discloses a photovoltaic module comprising glass layers, and in light of the particular advantages disclosed by Basket et al with respect to soda lime glass, the Examiner's position remains that it would have been obvious to one of ordinary skill in the art to utilize soda lime glass and thereby arrive at the presently claimed invention.

Thus, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on

combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Furthermore, with respect to the presence of sodium ions, evidence supporting the Examiner's position that sodium ions diffuse or migrate from the soda lime glass are found in Carlson et al, Dawson-Eli et al, and Pantchev et al. These references further bolster the Examiner's position that the use of soda lime glass in photovoltaic modules would necessarily result in the diffusion of the sodium ions from soda lime glass into the photovoltaic module. For example, Dawson-Elli on Page 152 discloses that *"[s]odium is known to influence the conductivity of CIS and that soda lime glass (SLG) introduces sodium in the CIS*". Page 377 of Carlson et al discloses sodium accumulation at the interface between glass and tin oxide layer results in delamination and corrosion, i.e. *"[s]odium ion conduction through the glass may play a role in the corrosion*". Finally, Page 431 of Pantchev et al discloses that "*In the case of waveguides prepared in glass, the [N]a containing substrates are used which could cause Na contamination of the deposited a-SiH film.*"

Therefore, in light of evidence provided by these references, the Examiner's position remains that the combination of JP'971 and Baskett et al necessarily results in the inclusion of sodium ions in the photovoltaic module as recited in the present claims.

14. Applicants argue that JP '971 as well the combination of references, Brandhorst and Spitzer, fail to disclose the presently claimed configuration, i.e. light entering from a side opposite the junction. However, while it is agreed that JP '971 alone fails to exemplify this

particular configuration, it is significant to note that the position of the n-type crystalline substrate 11 with respect to the thin film amorphous layers 12, 13 and the light incidence side light transmitting member, the solar cell module of JP '791 allows light to enter from both sides (Figures 1, 5, and 6), but the front surface side light transmitting member 3 is at the principal light incidence side (see paragraphs 0023 and 0026-0028). Therefore, light coming in from either direction contributes to the generation of electricity. Furthermore, with respect to the solar cell in JP '791's Figure 2, note in JP '791's paragraph 0024 that it is taught that on one principal plane of the crystalline silicon substrate 11, there is laminated an i-type a-Si layer 12 and p-type a-Si layer 13. It is also taught that on the principal plane on another side of the crystalline silicon substrate 11 there is laminated i-type a-Si layer 16 and n-type a-Si layer 17 (see paragraph 0024). JP '791 does not require said one principal plane on which the i-type a-Si layer 12 and p-type a-Si layer 13 to be the front face. JP '791 exemplifies the front face and recites "front face" in parenthesis for layers 12 and 13, and exemplifies the rear face and recites "rear face" in parenthesis for layers 16 and 17 (see paragraph 0024; and Figure 2). However, JP '791 does not require layers 12 and 13 to be at the front surface and layers 16 and 17 to be at the rear face. Thus, a skilled artisan readily recognizes that the solar cell seen in Figure 2 of JP '791 can be placed in JP '791's module in Figure 1 with layers 12 and 13 at the front face (i.e., layers 12 and 13 closer to light transmitting member 3) or at the rear face (i.e., layers 12 and 13 closer to rear surface member 4). Such is the case because the solar cell in said Figure 2 can receive light from both sides (see Figure 1; and the first sentence of paragraph 0024). Furthermore, the presence of a photovoltaic junction at the rear face of a solar cell is well known in the art as shown by

Brandhorst (Figures 2 and 4; and Column. 1, Line 60 through Column 2, Line 25) and Spitzer (see Figure 1).

In light of the disclosure in JP '791 as well as the evidence Brandhorst and Spitzer, it is the Examiner's position, absent evidence to the contrary, that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have prepared JP '701's solar cell module such that the solar cell in JP '791's Figure 2 is present in the module with the p-i-n junction between layers 11, 12 and 13 at the rear face of the solar cell, and thus, the n-type crystalline silicon substrate 11 is between the resin adjacent principal light transmitting member 3 and the junction formed between p-type a-Si layer 13 and n-type substrate 11 because light can enter from both sides of JP '791's solar cell and thus, the p-i-n junction can be closer to either the light transmitting member 3 or the rear surface member 4; JP '791 is not limited to layers 12 and 13 to be at the front surface; and the presence of a photovoltaic junction at the rear face of a solar cell is well known in the art as shown by Brandhorst and Spitzer.

In other words, to take the solar cell in JP '791's Figure 2, flip it over it over, and then insert it into JP '791's Figure 1, would have been within the level of ordinary skill in the art because light can enter from both sides of JP '791's solar cell in Figure 2, and thus, the p-i-n junction can be closer to either the light transmitting member 3 or the rear surface member 4; JP '791 is not limited to layers 12 and 13 to be at the front surface; and the presence of a photovoltaic junction at the rear face of a solar cell is well known in the art as shown by Brandhorst and Spitzer.

15. Further Applicants argue that the rejection of record proposed to dismantle and reconstruct the solar module disclosed by JP '791 in order to meet the present claim limitations. However, it is not the Examiner's position to dismantle and disintegrate the solar module disclosed by the primary reference. Rather it is the Examiner's position, absent evidence to the contrary, given that the reference discloses that light enters the module from both sides, that it would have been obvious to one of ordinary skill in the art to arrange the junction as recited in the present claims given that JP '791's discloses that light enters the both sides of solar cell solar cell in Figure 2, and thus, the rearrangement of the p-i-n junction would result is the junction begin closer to either the light transmitting member 3 or the rear surface member 4. That is, it is the Examiner's position that the currently proposed arrangement of the junction would have been obvious to one of ordinary skill in the art given that JP '791 is not limited to layers 12 and 13 being at the front surface and given the presence of a photovoltaic junction at the rear face of a solar cell is well known in the art as shown by Brandhorst and Spitzer.

16. Applicants argue that the issue is whether or not it would have been within the level of skill in the art of to modify the disclosure of JP '791 in order to obtain the presently claimed arrangement does not establish that it would have been obvious to do so. However, it is firstly noted that no evidence has been provided which would indicate that it would not have been obvious to one of ordinary skill in the art to do. Secondly, it is noted that the given the disclosure within the primary reference that light enters from both sides of the solar cell in combination with the supported teachings of Brandhorst and Spitzer, the Examiner's position

remains that it would have been obvious to one of ordinary skill in the art to modify the junction configuration disclosed by JP '791 and arrive at the presently claimed invention.

17. Applicants argue that the rejection of record is based on hindsight reconstruction of the prior art. However, it is not hindsight but rather the teaching within the references themselves. Specifically, JP '791 discloses the use of glass substrates, while Baskett et al discloses that soda lime glass is a preferred of glass utilized in photovoltaic devices. Further, with respect to the invention of the photovoltaic device, attention is directed to Figure of '791 as the Abstract of 'JP '791 (SOLUTION section) discloses that incident light is reflected to the solar cell elements, i.e. the light enters through the backside of photovoltaic cell through scattering. From this disclosure, it is clear that the photovoltaic device can function in an inverted manner. As further evidence for the Examiner's position with respect to the inversion of the device, attention is directed to by Brandhorst and Spitzer which disclose inverted junction configurations. Therefore, in light of the above, absent evidence to the contrary, it is the Examiner's position that it would have been obvious to invert the photovoltaic device disclosed by JP '791 and obtain a photovoltaic device comprising sodium ions via the use of sodium lime glass with a reasonable expectation of success.

Further, in response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge

gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXANDER C. KOLLIAS whose telephone number is (571)-270-3869. The examiner can normally be reached on Monday-Friday, 8:00 AM -5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on (571)-272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. C. K./
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